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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/935,352	08/21/2001	Larry A. Coldren	510015-269	9440

33717 7590 10/08/2003

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SANTA MONICA, CA 90404

EXAMINER

LEUNG, QUYEN PHAN

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/935,352

Applicant(s)

COLDREN ET AL.

Examiner

Quyen P. Leung

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-66 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the n-type material of tellurium (see claims 16, 41) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. In applicant's specification [0024] and [0025], the reference to tellurium related to it being a dopant material for the bottom and top DBRs made of AlGaAsSb. The claims suggest that the DBRs themselves are of the tellurium.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 15, 16, 18, 22, 31, 43, 49-50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Regarding claim 15, the phrase "preferably" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

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5. Claim 16 recites "the n-type material" in line 1. There is lack of antecedent basis for that limitation.

6. Claim 18 recites the limitation "said ratio" in line 1. There is lack of antecedent basis for that limitation.

7. Claim 22 recites "the n-type material" in line 1. There is lack of antecedent basis for that limitation.

8. Claim 31 recites the limitation "said ratio" in line 1. There is lack of antecedent basis for that limitation.

9. Claim 43 recites the limitation "said ratio" in line 1. There is lack of antecedent basis for that limitation.

10. Regarding claims 49-50, claim 49 recites "wherein the threshold current is reduced by more than about 20%" in lines 1-2. Claim 50 recites "wherein the quantum efficiency is increased by more than about 10%". It is not clear what further structural limitations are being implied.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

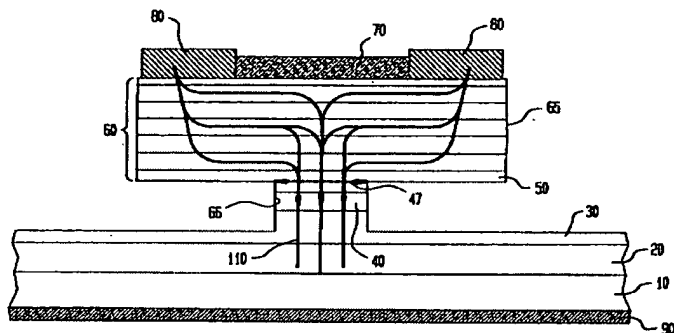
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 4-16, 18-19, 22, 24-27, 29, 31-32, 35-42, 44, 47-66 are rejected under 35 U.S.C. 102(b) as being anticipated by Jewell et al (5,245,622). Jewell discloses the claimed invention. Note figures 8, 10 which shows an aperture of a VCSEL formed by

selective etching (see col. 8 lines 32-55).

FIG. 8



aperture 47. Alternatively, as shown in FIG. 8, a vertical mesa etch followed by a selective lateral etch of the active region and surrounding layers can also be used to define the current aperture and isolate the device. Sidewalls 65 and 66 are defined by a vertical mesa etch and a lateral selective etch, respectively.

Other advantages can also be gained in the process of FIG. 8. Since the diameter of the device shown in FIG. 8 is typically between 4-10 μm , the carrier lifetime will be seriously reduced by non-radiative recombination at the periphery of the active region. When this region is defined by ion-implantation, there is no known way to obviate this problem except by a high temperature anneal which might also reduce the effect of the implantation and, hence compromise the structural integrity of the device.

When a mesa is etched to the level of the active material, it is possible for the lateral etch to include a passivation of sidewall 66 of the active material. This passivation preserves the carrier lifetime, reduces the non-radiative recombination and, therefore, results in a lower threshold current and increased optical quantum efficiency.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.


11. Claims 2-3, 17, 20-21, 23, 28, 30, 33-34, 43, 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell. Jewell has been discussed above except for the citric acid etchant or the tunnel junction or both DBRs being n-type. Examiner asserts that each of the citric acid etchant, the tunnel junction and both DBRs being n-type are known. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the citric acid etchant or the tunnel junction or both DBRs being n-type, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quyen P. Leung whose telephone number is (703) 308-0545. The examiner can normally be reached on 8:30-5:00, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Quyen P. Leung
Primary Examiner
Art Unit 2828

QPL